

(12) UK Patent Application (19) GB (11) 2 234 482 (13) A

(43) Date of A publication 06.02.1991

(21) Application No 8917946.9

(22) Date of filing 04.08.1989

(71) Applicant
Dudley Fabrications Limited
Millfields Road, Ettingshall, Wolverhampton,
West Midlands, WV4 6JE, United Kingdom

(72) Inventors
William John Woodall
Kenneth Alan Whitehouse
John Eric Hobson

(74) Agent and/or Address for Service
Audrey E Knowles
624 Pershore Road, Selly Park, Birmingham, B29 7HG,
United Kingdom

(51) INT CL⁶
B65G 21/08 // B65G 15/08 15/60

(52) UK CL (Edition K)
B8A AK AK15 AK4 AR3
U1S S1452

(56) Documents cited
GB 2124576 A GB 2000483 A GB 1518053 A
US 4359156 A US 3878936 A US 3809211 A

(58) Field of search
UK CL (Edition K) B8A AK ALD ALQ
INT CL⁶ B65G

(54) Conveyor belt

(57) A conveyor belt installation having a trough-shaped transport strand 11 enclosed by side and top panels 30 and 37 respectively to define a tunnel 41 for confining material carried by the transport strand 11 to prevent spillage and/or contamination by air-borne particles. The side panels 30 extend on opposed sides of the transport strand 11 and provide inclined support ledges 35 for the marginal edges of the transport strand 11 with strip members 36 arranged between the underside of the transport strand 11 and the support ledges 35 to seal the marginal edges and reduce wear of the transport strand 11. The panels 30, 37 are assembled in modular sections with a top panel 37 extending between a pair of opposed side panels 30 whereby any number of sections can be assembled to suit different lengths of transport strand 11. The invented arrangement for enclosing the transport strand 11 has application to new and existing installations.

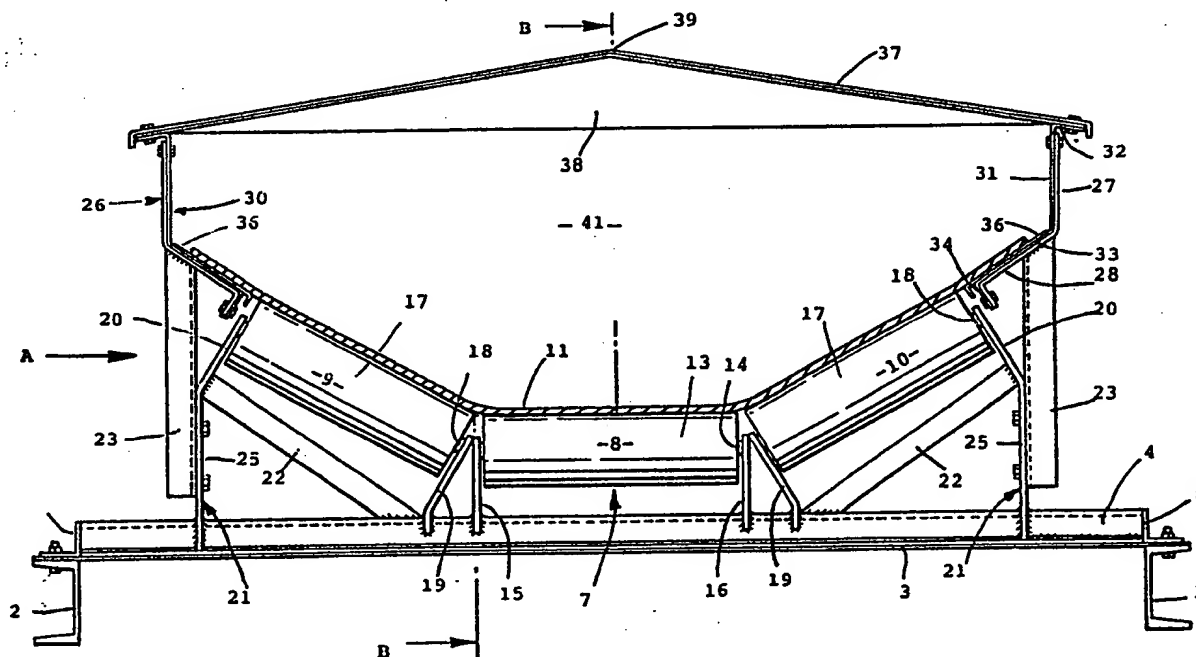
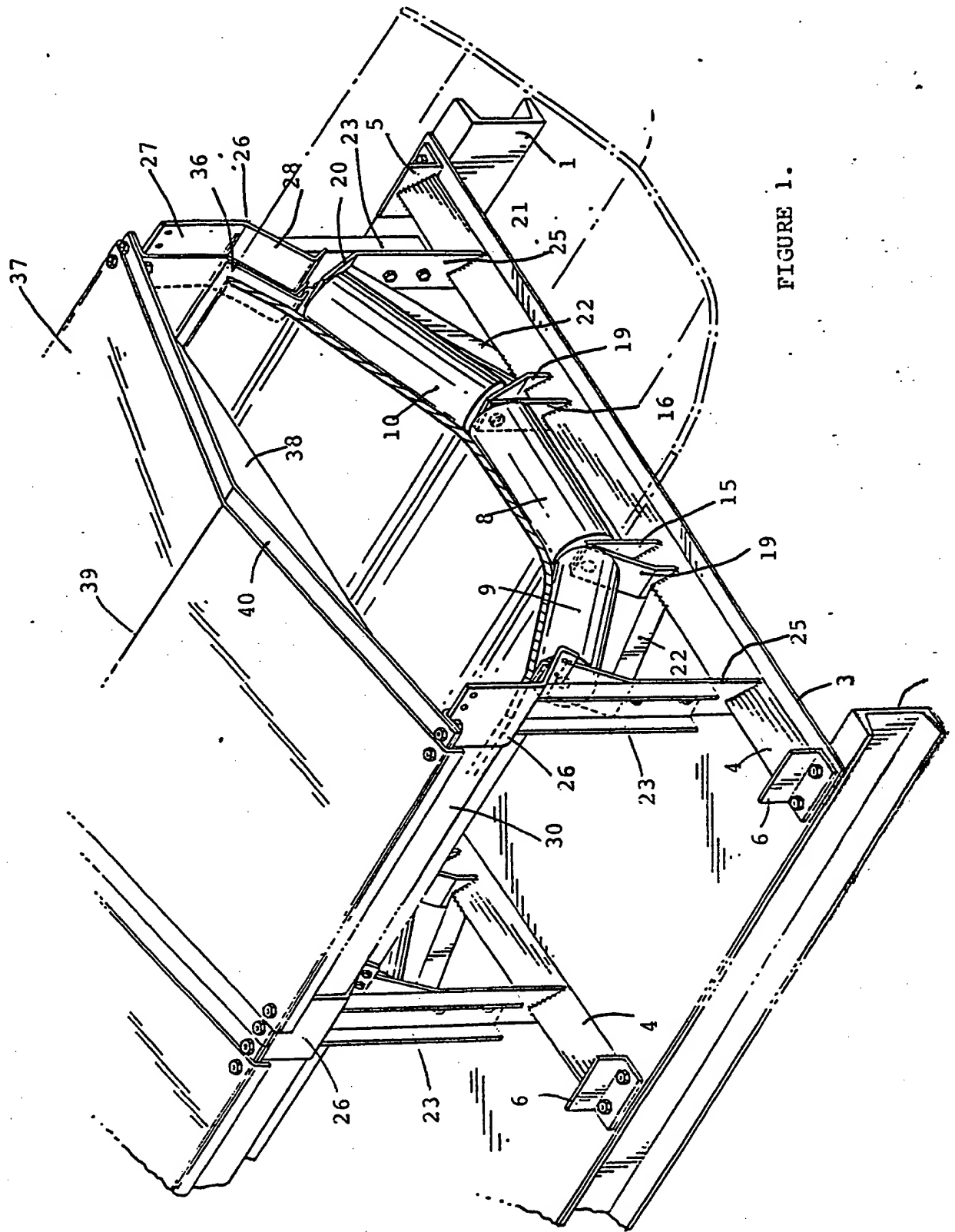


FIGURE 2.

The claims were filed later than the filing date within the period prescribed by Rule 25(1) of the Patents Rules 1982.

GB 2 234 482 A



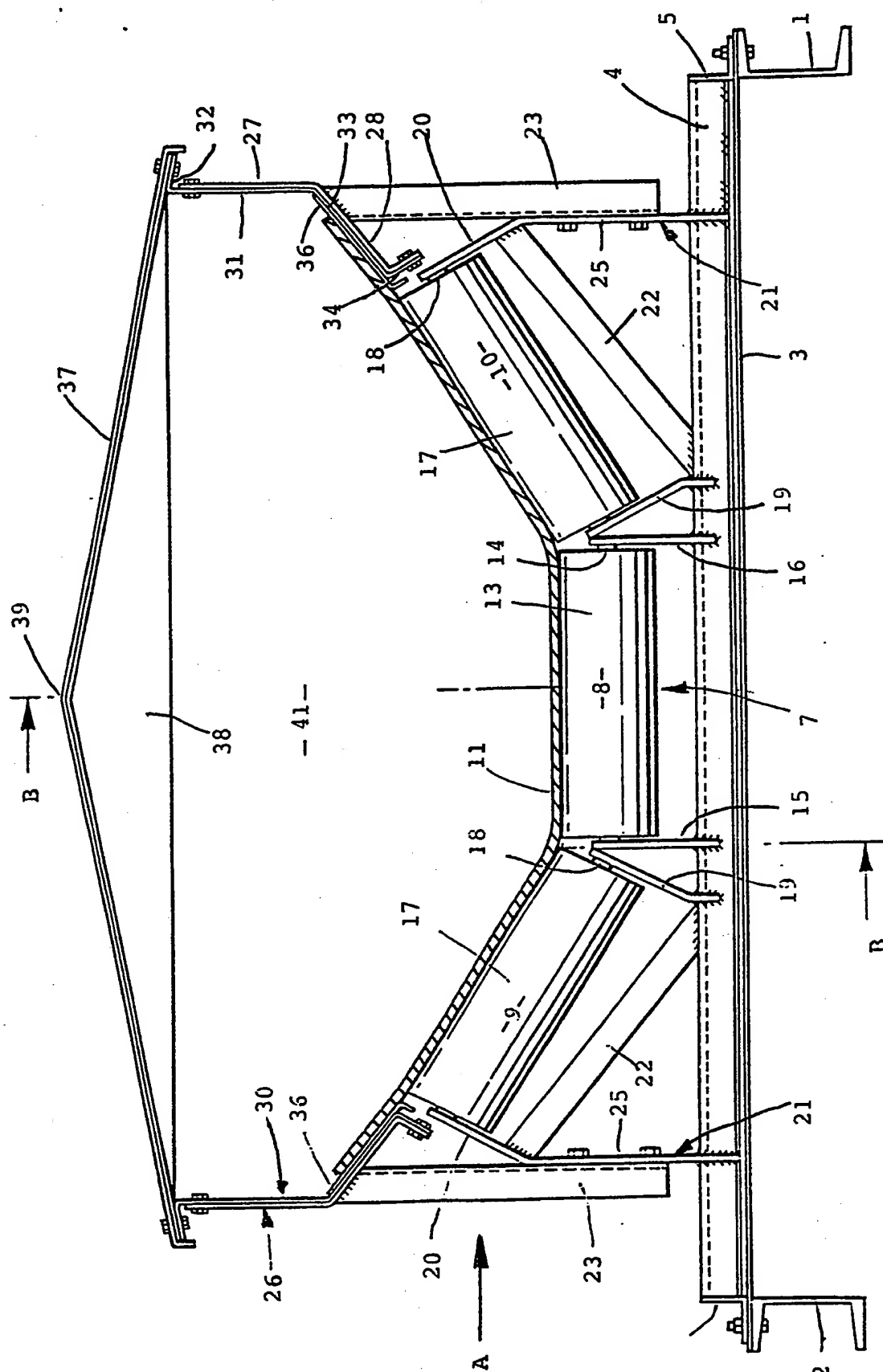


FIGURE 2.

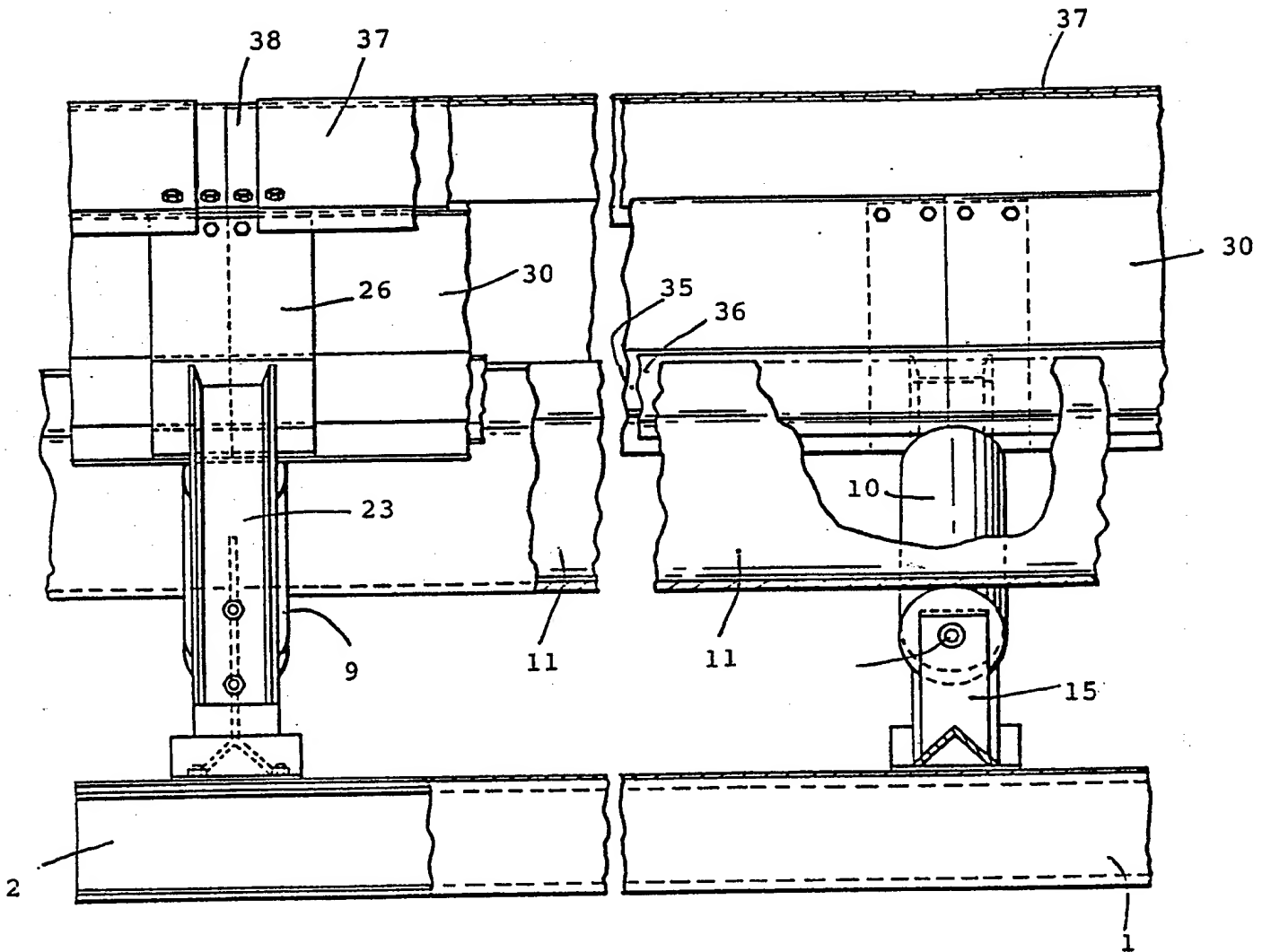


FIGURE 3.

FIGURE 4.

01 BELT CONVEYOR

This invention concerns belt conveyors that are commonly used for conveying bulk material such as sand, cement, flour, grain and other particulate or granular material to transport same from one location to another in a plant or installation.

It is already known to provide such belt conveyors in which the belt is supported so as to form a trough-shape so that the material is confined in the bottom of the trough whilst it is being carried by the conveyor belt.

Traditionally, such trough conveyor utilise a series of spaced apart roller sets to support the load supporting length of the belt, and these rollers define the trough-shape to which the belt material conforms.

Conventionally, in the conveyor, each roller set extends transverse to the direction of advancement of load supporting length of belt (the transport strand) whilst empty return length of belt (the return strand) merely runs underneath the transport strand with suitable guide or limited support rollers as may depend on the overall length of the return strand of the belt.

For the transport of particulate materials there are special problems which arise, and one of these is the way in which the material may be loaded onto the conveyor transport strand, and in some instances the loading is not done evenly so that the belt is overloaded and spillage can arise over the edges of the belt.

01 Another problem is that a belt conveyor
system often has to transport materials of
different volumetric density and volumetric
weights, for instance, different grades of sand,
05 or wet and dry sand. The load-weight carrying
capacity of belt conveyors has to be carefully
controlled, and often the original support
structure cannot be modified or reinforced without
great cost and disruption.

10 It is an object of this invention to provide
a belt conveyor of the trough kind suitable for
transporting such materials but providing
advantages in operation and installation.

15 According to the broadest aspect of this
invention, we provide in or for a conveyor
installation comprising a belt having a transport
strand supported so as to form a trough-shape, an
arrangement for enclosing the transport strand.

20 Preferably, the centre section of the
transport strand is supported in the required
trough-shape by a series of longitudinally spaced
apart transverse support members, for example
rollers, and the marginal edges are supported by
longitudinally extending support ledges.

25 Advantageously, the support ledges are
inclined to extend the trough-shape and the
inclination of the support ledges may be the same
as or different from that of the support members.

30 Conveniently, the support ledges are provided
by one or more side panels extending lengthwise of
the installation on each side and one or more top
panels extends between the side panels on opposed
sides of the installation to enclose the transport
strand.

01 Preferably, an elongate strip member is
interposed between each support ledge and the
underside of the marginal edge of the transport
strand to provide a smooth support surface for
05 sealing the edges of the belt and reducing wear.

Other features and advantages of the invented
arrangement will be understood from the following
description of an exemplary embodiment of the
invention with reference to the accompanying
10 drawings wherein:-

FIGURE 1 is a perspective view (partly broken
away) of the arrangement for the transport strand
of the belt in the conveyor;

FIGURE 2 is a sectional view across the
15 transport strand of the belt in the conveyor as
shown in Figure 1;

FIGURE 3 is a side view taken in the
direction of the arrow A in Figure 2; and

FIGURE 4 is a further view of the transport
20 strand of the belt in the conveyor taken in the
direction B-B as shown in Figure 2.

With reference to the invented arrangement
shown in the Drawings, the conveyor installation
for conveying bulk material such as sand or the
25 like particulate or granular material includes two
opposed main support members 1,2 that extend
substantially parallel and which would be mounted
on rigid structure in known manner.

Support beams 3 extend between the support
30 members 1,2 at spaced apart positions and each
beam 3 carries a bearer rail 4 of inverted angle
welded at each end to L-shaped brackets 5,6 bolted
through the beam 3 at each end to the support
members 1,2.

01 Each bearer rail 4 mounts a transverse roller
set 7 comprising three similar rollers 8,9,10
arranged to support the centre section of the
transport strand 11 of a continuous belt 12 in a
05 trough shape. The return strand (not shown) of
the belt 12 would, in known manner, extend
underneath or below the installation for empty
return travel supported by any suitable means (not
shown) as required.

10 The centre roller 8 comprises a right
cylindrical roll 13 mounted for free rotation on
an axial spindle 14 of which the opposed ends
engage respective upright medial bearers 15,16
welded to the bearer rail 4 to locate and support
15 the centre roller 8 substantially horizontal and
parallel to the bearer rail 4.

Each side roller 9,10 also comprises a
respective right cylindrical roll 17 mounted for
free rotation on a respective axial spindle 18 of
20 which the opposed ends engage an angled medial
bearer 19 and an angled upper part 20 of a side
bearer 21 welded to the bearer rail 4 to locate
and support each side roller 9,10 at the required
inclination. A respective bracing strut 22
25 extends between and is welded to each side
bearer 21 and the bearer rail 4 adjacent to the
associated angled medial bearer 19.

A respective side support 23 of channel-
section is bolted to an upright lower part 25 of
30 each side bearer 21 and has a support bracket 26
welded to the upper end.

01 Each support bracket 26 has an upright side
flange 27 and a downwardly inclined base flange 28
terminating in a dependent bottom edge flange 29.
The inclination of the base flange 28 is similar
05 to that of the adjacent side roller 9,10 and the
side support 23 is bolted on the side bearer 21 to
position the base flange 28 generally in alignment
with the upper support surface of the adjacent
side roller 9,10.

10 On each side of the installation, the
brackets 26 mount a respective series of similar
side panels 30 each having an upright side wall 31
terminating in an outwardly directed top edge
flange 32 and a downwardly inclined base wall 33
15 terminating in a dependent bottom edge flange 34.

Each side panel 30 extends between and is
bolted at each end to two successive brackets 26
with the side and base walls 31,32 seating against
the side and base flanges 27,28 of the brackets 26
20 and the respective dependent bottom edge
flanges 29,34 abutting.

The assembled side panels 30 define, on each
side of the installation, a continuous side wall
and a continuous base wall with the base wall
25 defining a support ledge 35 forming an extension
of the trough shape of the roller sets 7. The
opposed marginal edges of the transport strand 11
extending beyond the roller sets 7 are supported
on these support ledges 35 with a respective
30 elongate strip member 36 interposed therebetween
to provide a continuous seal along each lateral
edge of the transport strand 11 and to reduce wear
of the edges of the belt 12.

01 A series of top panels 37 extends between
opposed pairs of side panels 30 and each top
panel 37 has its transverse edges supported by
05 respective spaced apart bridge members 38 bolted
at each end to the respective top edge flanges 32
of the opposed side panels 30.

Each top panel 37 is bolted at each end
through the bridge members 38 to the respective
top edge flanges 32 of the opposed side panels 30
10 and is formed to provide a central apex 39 like a
pitched roof with the bridge members 38 having
inclined upper support faces 40 matching this
pitched form.

As will now be appreciated, the central
15 section of the transport strand 11 of the belt 12
is supported in a trough shape by the roller
sets 7, and the marginal edges are supported in an
extension of the trough shape by the support
ledges 35 provided on each side of the
20 installation by the base walls 33 of the side
panels 30 and are sealed on the underside by the
strip members 36 positioned therebetween. The
side panels 30 and top panels 37 totally enclose
the transport strand 11 of the belt 12 and
25 material loaded on the belt 12 is confined within
the tunnel 41 formed by the belt 12, the side
panels 30 and top panels 37. The edges of the
transport strand 11 are in continuous sealing
engagement with the strip members 36 and any
30 material loaded on the transport strand 11 that is
carried up the sides of the trough-shape cannot
fall off the edges of the belt 12 and is confined
within the tunnel 41. Similarly, any air born

01 fines or dust created by disturbance of the
material is confined within the tunnel 41. As a
result, spillage or contamination is avoided by
the invented arrangement of the side and top
05 panels 30,37 enclosing the transport strand 11.

It will be understood that the invented
arrangement has application both for new original
installations as well as for modifying or
converting an existing belt conveyor to totally
10 enclose the transport strand of the belt. For
such modification or conversion, the side and top
panels together with the bridge support members,
the side support members and the strip members may
be provided as a separate kit of parts for
15 attachment to an existing installation and, if
required, a wider belt provided to extend beyond
the edges of the existing trough-shaped support
means to engage the strip members for sealing the
edges of the belt. In this way, not only is the
20 transport strand of the belt totally enclosed as
described above but the load carrying capacity of
the installation is increased by the use of a
wider belt thereby improving throughput and hence
efficiency whilst retaining the essential support
25 structure of the original installation.

As will be appreciated, the assembly of the
side panels and top panels in sections bolted to
the side supports enables the same basic
components to be used for installations of
30 different lengths. This has important advantages
both for the manufacturer and for the user in
reducing the number of components required.

01 It will be understood that the invented
arrangement is not limited to the embodiment
above-described. For example, the trough-shape
imparted to the belt by the roller sets may be
05 provided by any construction and arrangement of
rollers or by any other suitable support means.

 The base walls of the side panels may be
inclined at the same angle as the adjacent side
rollers or at a different angle. For example, in
10 the above embodiment, the inclination of the base
walls and side rollers is substantially the same
but the inclination of the base walls to the
horizontal could exceed that of the side rollers
to resist further the displacement of material
15 loaded on the belt up the sides of the trough
shape. Alternatively, the inclination of the base
walls to the horizontal could be less than that of
the side rollers where displacement of the
material up the sides of the trough-shape is not a
20 significant problem.

01 Claims:

1. In or for a conveyor installation comprising a belt having a transport strand supported so as to form a trough-shape, an arrangement of one or
05 more side panels extending lengthwise of the installation on each side and one or more top panels extending between the side panels on opposed sides of the installation to enclose the transport strand.
- 10 2. An arrangement according to Claim 1 wherein the side panels provide respective support ledges extending lengthwise of the installation on each side for the marginal edges of the transport strand.
- 15 3. An arrangement according to Claim 2 wherein the support ledges are inclined to extend the trough shape.
4. An arrangement according to Claim 3 wherein the support ledges extend the trough shape at the
20 same angle.
5. An arrangement according to Claim 3 wherein the the support ledges extend the trough shape at a different angle.
6. An arrangement according to any one of
25 Claims 2 to 5 wherein an elongate strip member is interposed between each support ledge and the underside of the associated marginal edge of the transport strand.
7. An arrangement according to Claim 6 wherein
30 the strip members provide a smooth support surface for sealing the edges of the belt and reducing wear.

- 01 8. An arrangement according to any one of the
preceding Claims wherein support brackets for the
side panels are provided on each side of the
installation.
- 05 9. An arrangement according to Claim 8 wherein
the side panels extend between and are releasably
secured at each end to the support brackets.
- 10 10. An arrangement according to Claim 8 or
Claim 9 wherein the support brackets are arranged
at the upper ends of side supports detachably
mounted on each side of the installation.
- 15 11. An arrangement according to any one of the
preceding Claims wherein each top panel extends
between opposed side panels and has its transverse
edges supported by respective bridge members
secured at each end to the opposed side panels.
- 20 12. An arrangement according to any one of the
preceding Claims wherein the transport strand is
supported in the trough shape by a series of
longitudinally spaced roller sets each comprising
a centre roller disposed between a pair of side
rollers inclined upwardly and outwardly relative
to the centre roller.
- 25 13. An arrangement according to any one of the
preceding Claims wherein the side and top panels
are adapted for assembly as modular sections each
comprising a top panel and a pair of side panels.
- 30 14. In or for a conveyor installation comprising
a belt having a transport strand supported so as
to form a trough shape, an arrangement for
enclosing the transport strand.
15. In or for a conveyor installation comprising
a belt having a transport strand supported so as

- 01 to form a trough shape, an arrangement for
enclosing the transport strand substantially as
hereinbefore described with reference to the
accompanying drawings.
- 05 16. A kit of parts comprising side and top panels
for assembly in modular sections to enclose a
trough-shaped transport strand of a conveyor belt
wherein the side panels extend on opposed sides of
the transport strand with the or each top panel
10 extending between a pair of opposed side panels
above the transport strand, and the side panels
providing support ledges for the marginal edges of
the transport strand with the support ledges being
inclined to extend the trough shape of the
15 transport strand, the arrangement being such that
the side and top panels define with the transport
strand a tunnel for confining material carried by
the transport strand.